



WELDING PROCEDURE SPECIFICATION

WPS - 2010-1 REV. NO.: 1 DATE: 7/22/2005 ****APPLICABILITY****
WELDING PROCESS: GTAW- and GTAW- ASME: X AWS: X OTHER:
SUPPORTING PQR: Z-WS-3(X-X) Z-WS-4(X-X) P-WS-227-1 P-WS-227-2 P-WS-218-1

JOINT: This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection etc.

Weld Joint Type: Butt/Fillet	Class:	Full/partial penetration
See GWS 1-06 and WFP's for joint details	Preparation:	Thermal/Mechanical
Root Opening: 0" to .125"	Backing:	With/without
Backgrind root: Double sided joints	Backing Mat.:	CS strap/ring
Bkgrd Method: Mechanical/thermal	GTAW Flux: N/A	Backing Retainer: N/A

FILLER METALS	Class:	ER70S-X and ER70S-X
A No: 1 SFA Class: 5.18 and 5.18 F No: 6 and 6 Size: .045 .062 .093 .125		
Insert: N Insert Desc.: N/A		Weld Metal Thickness Ranges:
Flux: Type: NA Size: N/A	AWS Root Pass:	0.062 thru 1.062
Filler Metal Note: Welding without filler material is not permitted.	AWS Balance:	0.062 thru 1.062
	ASME Root Pass:	0.04 thru 1.062
	ASME Balance:	0.040 thru 1.062

BASE MATERIAL	P No. 1	Gr No. All	to: P No. 1	Gr No. All
Spec. CS ≤ .030 C	Grade: All	to: Spec. CS ≤ .030 C		Grade: All
Qualified Pipe Dia. Range: ≥ AWS: 4 ASME: 0.125				
Qualified Thickness Range: AWS: 0.062 thru 1.062 ASME: 0.040 thru 1.062				

QUALIFIED POSITIONS: AWS: All ASME: All Vert. Prog.: V/Up

Preheat Min. Temp.: 70 °F	GAS: Shielding: Argon or	
Interpass Max. Temp.: 500 °F	Gas Composition: 100 / 0 / 0 %	0 / 0 / %
Preheat Maintenance: 70 °F	Gas Flow Rate cfh: 10 to 25	0 to 0
PWHT: Time @ °F Temp. 0	Backing Gas/Comp: None	0 %
Temp. Range: 0 °F	Backing Gas Flow cfh: 0 to 0	
to 0 °F	Trailing Gas/Comp: N/A	0 %

APPROVAL: Signatures on file at ENG **DATE:** 7/22/2005

WELDING CHARACTERISTICS:

Current: DCEN and DCEN **Tungsten Type:** EWTh-2 **Transfer Mode:** Manual
Ranges: Amps 35 to 160 **Tungsten Dia.:** **Pulsing Cycle:** 0 to 0
Volts to **Background Current:** 0
Fuel Gas: N/A **Flame:** N/A **Braze temp. °F** 0 to 0

WELDING TECHNIQUE: For fabrication specific requirements such as fittup, cleaning, grinding, PWHT and inspection criteria refer to Volume 2, Welding Fabrication

Technique: Manual **Cleaning Method:** Wire Brush, File, Grind
Single Pass or Multi Pass: M **Stringer or Weave bead (S/W):** S/W **Oscillation:** N
GMAW Gun Angle °: 0 to 0 **Forehand or Backhand for GMAW (F/B):** N/A
GMAW/FCAW Tube to work distance: N/A
Maximum K/J Heat Input: N/A **Travel speed:** Variable **Gas Cup Size:** 3 to 6

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: *Y **Nil-Ductil Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: 1) Peening is not allowed. 2) *Contact ENG DECS Welding Program Manager or Welding Engineer/SME if procedure is used on impact tested materials. 3) Use of RG 65 wire is limited to sheet steel, 10 gage and thinner.

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	GTAW-	ER70S-X	.045	35 to 80	to	to	0 to 0	
2	GTAW-	ER70S-X	.062	65 to 100	to	to		
3	GTAW-	ER70S-X	.093	80 to 120	to	to		
4	GTAW-	ER70S-X	.125	95 to 140	to	to		
5								
6								

REM. * Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.

Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees possession and use of LANL procedures and qualifications.